

Rio Pueblo de Taos Watershed Restoration Action Strategy (WRAS)



Prepared by the Rio Pueblo de Taos Watershed Group, under a 319 grant administered by
Amigos Bravos, Friends of Wild Rivers
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Abbreviations & Acronyms

BLM- Bureau of Land Management
BMP- Best Management Practice
CWA- Clean Water Act
DMR- Discharge Monitoring Report
EPA- U.S. Environmental Protection Agency
HFRA- Healthy Forest Restoration Act
HUC- Hydrologic Unit Code
NMED- New Mexico Environment Department
NMWQA- New Mexico Water Quality Act
NPDES- National Pollutant Discharge Elimination System
NPS- Non-point Source Pollution
NTU- Nephelometric Turbidity Unit
OHV- Off-highway Vehicle
RFPs- Request for Proposals
SBD- Stream Bottom Deposit
SWQB- Surface Water Quality Bureau
TAS- Treatment as States
TMDL- Total Maximum Daily Load
USFS- United States Forest Service
UWA- Unified Watershed Assessment
WPS- Watershed Protections Section
WQCC- Water Quality Control Commission
WQS- Water Quality Standards
WRAS- Watershed Restoration Action Strategy

Executive Summary

This Watershed Restoration Action Strategy (WRAS) for the Rio Pueblo de Taos has been developed as part of the Clean Water Act 319 Program for controlling non-point source pollution. Non-point source pollution is pollution from diffuse sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). Non-point pollution reaches the river through polluted runoff from rain or snow or any pollution that reaches the water body from any means besides a pipe or other specific conveyance.

The New Mexico Environment Department (NMED) administers the 319 Program for the state by granting funds under two grant programs. The first is a grant program to fund the establishment of watershed groups, draft a WRAS, and identify future on-the-ground projects for impaired rivers. The second grant program provides funding to implement on-the-ground projects identified in the WRAS. Before an entity can receive funding for an on-the-ground project in a watershed, there must be a WRAS completed and approved for that watershed. Once a WRAS is drafted and approved, any entity in the watershed may use the WRAS to help them identify and apply for funding for an on-the-ground project. To apply for funding a group does not have to be involved in the initial effort to write the WRAS, as the WRAS, once drafted, becomes a public document to be used by all watershed residents to protect their watershed.

In 2004 Amigos Bravos, Friends of the Wild Rivers, received 319 program funds to start a watershed group for the Rio Pueblo de Taos Watershed and to assist this watershed group in drafting a WRAS. This WRAS is a result of that project. The WRAS was drafted with input from diverse stakeholders to characterize the geology, hydrology and history of the watershed; identify sources of non-point source (NPS) pollution; identify potential restoration needs and projects; and identify stakeholders and sources of information and resources.

Potential projects have been identified on pages 29-36 of this document. We hope that you utilize this WRAS to help identify ways that you can protect and restore the Rio Pueblo de Taos Watershed. Watersheds residents and organizations can contact the New Mexico Surface Water Quality Bureau (SWQB) at (505)827-0187 to find out how to apply for funding to implement watershed restoration activities. This WRAS is a living document and can be modified and added to at any point. Please contact the SWQB and/or the Rio Pueblo de Taos Watershed Group with your suggestions.

I. Regulatory Overview

A. The Clean Water Act - The Rio Pueblo de Taos Watershed Group and this Watershed Restoration Action Strategy (WRAS) is the indirect result of United States federal water policy aimed at curtailing pollution in the nation's waters. The Clean Water Act (CWA) of 1972, which was amended in 1977 and 1987, lays the foundation for the management of water quality in the United States. It is a culmination of over a century of federal water policy aimed directly at preventing water pollution and improving water quality on a national scale. Its primary goal is to achieve a level of water quality that is "fishable and swimmable". While it is an act of Congress, with the U.S. Environmental Protection Agency (EPA) providing administration and oversight of the CWA, it also empowers states to take responsibility for administrative and permitting duties. The CWA was developed initially with the inherent objective "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." In order to do so, it calls upon the states to establish water quality standards (WQS), and monitor compliance and discharges.

Each state begins with establishing beneficial uses of a watercourse. Specific biological, chemical and descriptive thresholds are then established along with an anti-degradation measure to prevent the watercourses from deteriorating below the standards for the established beneficial use. Sections 303(d)/305(b) of the CWA call for bi-annual watercourse assessments conducted by the states. Watercourses not meeting standards for beneficial uses are categorized as "impaired".

Implementation of the CWA falls under both federal and state environmental agencies. The EPA is the federal agency charged with issuing and enforcing the CWA. To accomplish this mandate, the EPA works in conjunction with state environmental agencies to facilitate implementation of strategies.

In New Mexico, it is the Water Quality Control Commission (WQCC), under authority from the New Mexico Water Quality Control Act (NMWQCA), who establishes water quality standards for both surface water and groundwater. The state standards are then subject to approval by the EPA. The WQCC also establishes state regulations and New Mexico's non-point source (NPS) management program.

The NPS program addresses pollutants entering New Mexico's waterways from all non-point source discharges. The WQCC has no technical staff to monitor and enforce state water

quality standards and its other duties under the CWA, therefore, it has delegated its responsibilities to the New Mexico Environment Department (NMED).

NMED is the state agency that coordinates with federal, state and local organizations to address NPS pollution. NMED's responsibilities under the CWA include implementation of water quality standards, monitoring and reporting on the State of New Mexico's waters, creating a list of impaired waters, regulating point-sources of pollution in conjunction with the EPA, creating limits to concentrations and volumes of pollutant inputs and providing financial and technical assistance to private landowners, businesses and municipalities to reduce NPS pollution. The bureau within the NMED that implements these programs is the Surface Water Quality Bureau (SWQB). Within the SWQB, the Watershed Protection Section (WPS) manages watershed projects and management practices aimed at NPS prevention. The WPS coordinates community efforts on the local scale to educate the public about land use practices that contribute to NPS pollution and provide specialized support to communities in surface water restoration and remediation due to NPS.

B. Total Maximum Daily Load (TMDL) The New Mexico Environment Department's (NMED) Surface Water Quality Bureau (SWQB) routinely tests water quality in all of the state's waters. If water quality standards are exceeded, then the water body is considered impaired and gets placed on the state's 303(d) list of impaired waters. NMED then drafts Total Maximum Daily Loads (TMDLs) for each water body on this list. A TMDL is a watershed-based allowance for the pollution permitted in a watercourse. It is defined by the U.S. Environmental Protection Agency (EPA) as "a written plan and analysis established to ensure that a water body will attain and maintain water quality standards including consideration of existing pollutant loads and reasonably foreseeable increases in pollutant loads." A TMDL can be established for an entire watercourse or a specific segment. With an emphasis on watershed-based planning for non-point source (NPS) programs, a TMDL cleanup plan that includes implementation of NPS reduction practices is a necessary component of a NPS program proposal.

Section 303(d) of the Federal Clean Water Act requires states to develop Total Maximum Daily Load Management Plans for water bodies determined to be water quality limited. A total maximum daily load documents the amount of a pollutant a water body can assimilate without violating a state's water quality standards. It also allocates that load capacity to known point sources and non-point sources at a given flow. Total maximum daily loads are defined in 40 Code of Federal Regulations Part 130 as the sum of the

individual Waste Load Allocations for non-point sources, including a margin of safety and natural background conditions (USEPA, 1994).

Once a TMDL has been drafted for a water body, the New Mexico Environment Department makes that water body eligible to receive 319 monies to address the non-point source pollution problems in the watershed.

C. Section 319 of the Clean Water Act - Section 319 is the main body of the Clean Water Act (CWA) that authorizes programs at the local level, on a watershed scale, to mitigate the effects of non-point source pollution (NPS). Section 319 has three main criteria. First, states must prepare an impairment report, or 303(d)/305(b) report, that documents the state's water quality problems. In this report, impaired waters must be identified along with the categories of pollutants that are contributing to the impairment. Along with this report, state and local programs must be identified that will be utilized in the control of the NPS pollution.

Second, states must develop a management program to address NPS pollution problems identified in their report. This program must identify best management practices (BMPs), local resources to be utilized and a timeline indicating a schedule of implementation for controlling the NPS pollution.

Third, section 319 allocates funding for states through the U.S. Environmental Protection Agency (EPA) to fund programs for NPS pollution prevention and control. The NPS pollution control grants, or section 319 Grants, were created to address NPS pollution through the implementation of state management programs. Congress appropriates these funds annually. The monies go to the EPA, which distributes the funds to states based on a formula including such factors as state population and critical habitat. In addition, states must have shown progress from the previous year regarding the implementation schedule of their action plan to address NPS. Eligible states must also contribute a 40% matching fund in order to receive 319 Grant monies.

NPS program monies from section 319 allow for 10% of the funds to be used for administering a state NPS program. The remaining 90% are distributed in a pass-through grant program that allows other agencies, local governments and non-profit organizations to apply in a competitive process for the monies to survey NPS problems, create outreach campaigns to prevent further NPS and implement practices that will reduce NPS.

New Mexico has utilized a method called the Unified Watershed Assessment (UWA) that emphasizes local level collaboration inclusive of states, tribes and partner agencies, such as environmental organizations, federal agencies, and potential partners. The UWA in New Mexico has identified critical watersheds according to their Hydrologic Unit Code (HUC). The watersheds were placed into the following categories: “Category I - Watersheds in need of restoration; Category II - Watersheds Meeting Goals; Category III - Watersheds with Pristine Sensitive Aquatic System Conditions; and Category IV - Watersheds with Insufficient Data to make an Assessment” (NMED, 2004). The Rio Pueblo de Taos is located in the Upper Rio Grande Watershed, a Category I Watershed. Watersheds “in need of restoration” receive priority funding for restoration projects from section 319 of the CWA, or NPS pollution control grants.

Much like the federal-state matching funds requirement, 319 grantees must also provide a 40% non-federal funding match. This matching fund can come from a variety of sources including private individuals, organizations, local or state governments and in-kind donations of volunteer time, equipment or space. With the 319 monies received, local agencies, governments or non-profits may use up to 10% for administrative costs.

Projects under section 319 of the CWA fall under the Watershed Protection Section (WPS) area of guidance within the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED). The SWQB has a competitive grant program that puts out requests for proposals (RFPs) to regional or local organizations to carry out grassroots activities within a watershed for addressing water quality issues through on-the-ground practices. This process is mandated through section 319 of the CWA however, NMED has authority to review applicants and administer 319 monies to organizations that meet both federal and state criteria.

Local organizations must have a plan to form a coalition or watershed group within the localized area and then work in a multi-stakeholder process to develop a Watershed Restoration Action Strategy (WRAS). A timeline with goals and objectives must be submitted with the proposal. Technical support to watershed organizations is provided by the Watershed Protection Section (WPS) of the New Mexico Environment Department (NMED). Once a WRAS has been drafted, reviewed and completed, on-the-ground project proposals may be funded through other regulatory or non-regulatory grant programs.

D. Amigos Bravos - Founded in 1988 as a 501(c)3 organization, Amigos Bravos: *Friends of the Wild Rivers*, is based out of Taos, New Mexico. Amigos Bravos is a well-

established and nationally recognized river conservation organization guided by social justice principles. They work to preserve and restore the ecological and cultural integrity of New Mexico's rivers and watersheds. Amigos Bravos' mission is to hold polluters accountable and ensure that New Mexico's rivers provide New Mexico with a supply of clean water for drinking and growing food as well as a safe place to swim, fish and go boating. Their work is inspired by New Mexico's traditional water users, such as acequia associations, Pueblos, and farmers. They see water as both a cultural and natural resource that must be managed in a fair and sustainable way. Through conscious management, rivers and the communities that depend on New Mexico's waters have a future. Amigos Bravos is "dedicated to preserving both the ecological *and* cultural richness of the Río Grande watershed" (Amigos Bravos, 1988). Part of Amigos Bravos' work focuses on enabling local communities to become involved in protecting and restoring their waters. The Clean Water Circuit Rider Program utilizes the Clean Water Act (CWA) as a tool for watershed-based planning. "The goal of the program is to increase the capacity of New Mexico communities to restore polluted river systems and to deal with future pollution problems" (Amigos Bravos, 2002).

Under this program, Amigos Bravos has received 319 program monies for protecting and restoring land and water quality within the Rio Pueblo de Taos Watershed. They have written a strategic work plan titled the *Rio Pueblo de Taos Watershed Stakeholder Action Initiative*. It is through this initiative that the Rio Pueblo de Taos Watershed Group was formed.

II. Rio Pueblo de Taos Watershed Group

A. Watershed Group Formation -The Rio Pueblo de Taos Watershed Group was formed in January, 2005 by bringing together local citizens, Taos Pueblo, agencies and interest groups. A full list of agencies and groups that were contacted are listed in section IX. The watershed group hopes to utilize non-regulatory means of effecting action-based outcomes by realizing the broad goals of the Clean Water Act (CWA) while honoring the rich cultural traditions and ecological integrity of the area.

The Rio Pueblo de Taos Watershed Group has defined its mission statement as "to restore and preserve the natural beauty, water quality, and the native riparian ecosystems of the Rio Pueblo de Taos Watershed by listening to and incorporating the diverse values and voices of watershed residents into watershed protection and restoration activities.

We hope to realize this mission by pursuing the following objectives:

1. Identifying and eliminating chemical and physical pollution sources, including the impacts from storm-water runoff;
2. promoting public awareness through watershed education and volunteer restoration projects;
3. implementing on-the-ground restoration projects and policies to protect the watershed for the benefit of our communities, fish, wildlife and public health.”

B. Watershed Restoration Action Strategy Components- The Rio Pueblo de Taos

Watershed Restoration Action Strategy (WRAS) was created by the Rio Pueblo de Taos Watershed Group utilizing the six major components of a WRAS, as outlined by the U.S. Environmental Protection Agency (EPA) and the New Mexico Environment Department (NMED) as a guideline (NMED, 1999). This document was crafted to be a dynamic work in progress. As more information becomes available and changes occur in the watershed, the WRAS will be flexible and adaptive to meet the ever-changing needs of the times.

The WRAS is a core component of section 319 of the NMED non-point source (NPS) pollution program. The development of a WRAS is accomplished through an open dialog that can include federal, state, local governments and agencies, tribes, watershed groups and the general public to talk about why their watershed is impaired and how to go about correcting the situation. The WRAS has six essential components according to both EPA and NMED guidelines (NMED, 1999).

1. *Public Outreach.* Public Outreach is the first and foremost component of developing a WRAS. Within the watershed, stakeholders must be identified and included in both the development and implementation process of a WRAS.
2. *Monitoring/Evaluation.* Monitoring and evaluation activities include goal setting. Short and long-term goals must be identified with ways of achieving them. The monitoring and evaluation should show sufficient progress towards the achievement of the goals or the need to re-evaluate and create new strategies for obtaining stated goals.
3. *Defining Specific Water Quality Problems.* Defining specific problems that are contributing to degraded water quality is a process that includes historical land uses and current ones. This step includes data collection and evaluation to pinpoint a causal relationship between a land use and impairment.
4. *Defining Necessary Actions to Obtain Water Quality Goals.* Actions can include a wide variety of outreach campaigns, further studies or on-the-ground practices to improve water quality.
5. *Implementation Schedule.* An implementation schedule is a summary of all past, present and future projects that have been or will be occurring within the watershed.

6. *Funding.* Funding for the watershed restoration measures must be clearly outlined, including other projects and funding to continue efforts once 319 monies have been depleted.

In the development of this document, the following categories were developed from the EPA and NMED criteria. These components were instrumental in the development process and will be further detailed in the following sections.

- **Education and outreach** - Conduct public workshops and hold monthly meetings for federal, state, regional and local governmental agencies, civil society organizations, public and private interests, as well as other stakeholders in the watershed. Provide informational materials and reports to stakeholders to further educate the watershed group about water quality and to solicit feedback regarding the drafting of a WRAS.
- **Watershed description** - Research and document the cultural and natural resource base and land uses in the watershed. Provide a background about the history and current activities occurring within the watershed as well as identify the resource-base available for further research and data needs when developing and planning for Best Management Practices (BMPs).
- **Water Quality and Land-use Problems** - Utilize published and unpublished reports, professional expertise, personal communication, and fieldwork to identify land-use activities in the watershed that are impairing the water quality.
- **Water Quality Goals** - Collectively develop water quality and land-use goals with expected outcomes for the watershed.
- **Action plan and Implementation Schedule**- Generate an action plan for restoration activities, monitoring and data collection in collaboration with other existing and related programs or studies.
- **Funding and Coordination**- Utilizing the water quality and related land-use goals, the action plan and implementation schedule, determine financial requirements and seek sources of funding including in-kind match considerations from coordinating organizations to implement the WRAS.

III. Education and Outreach

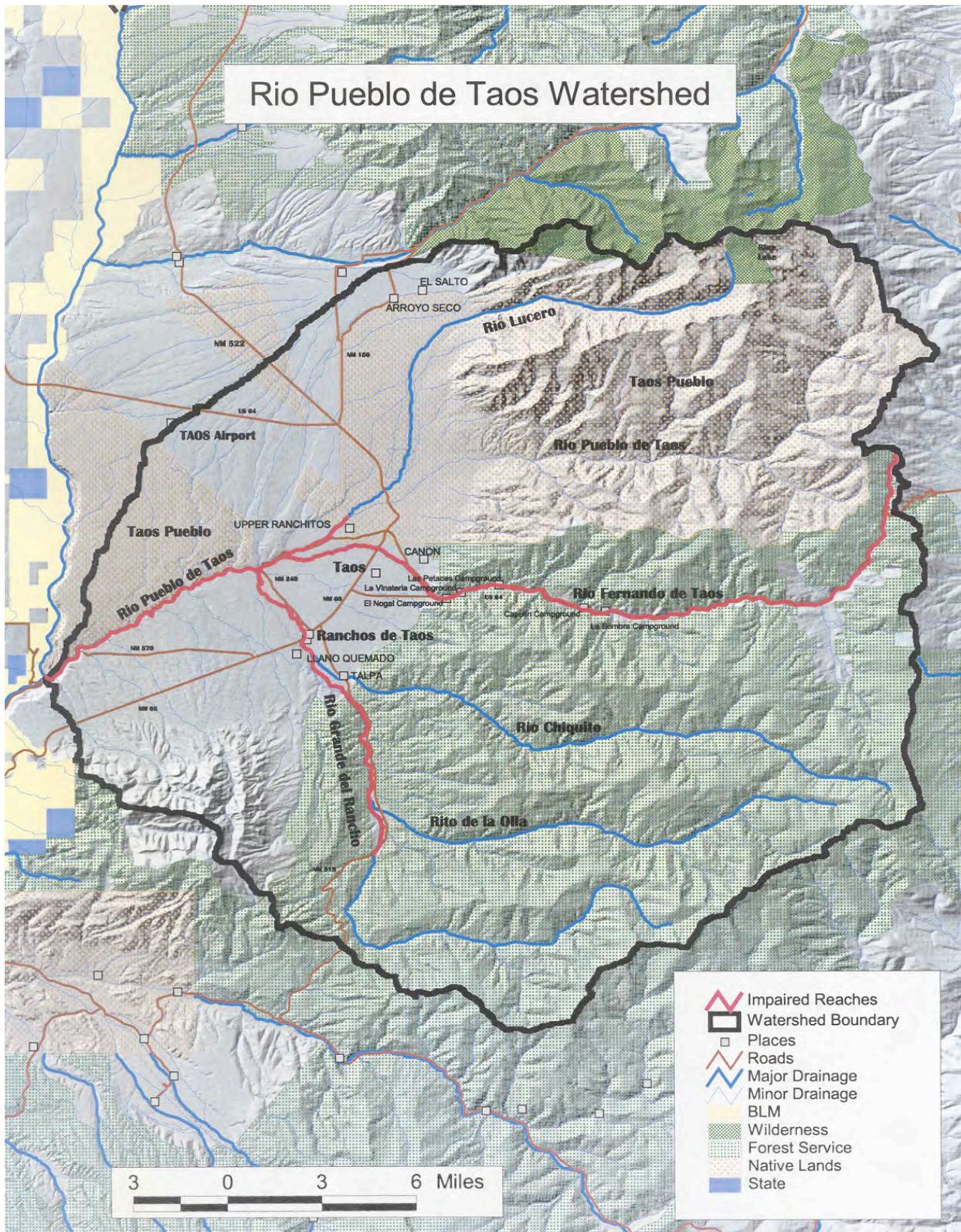
An important purpose of the Rio Pueblo de Taos Watershed Group is to involve the public as members in improving water quality and watershed health. Members of the Rio Pueblo de Taos Watershed Group strongly believe active stakeholder participation is the key to developing a sustainable Watershed Restoration Action Strategy (WRAS). Active participation can be achieved through education and outreach in the watershed community. This multi-faceted endeavor must include the cultural and ecological complexities of the watershed since they are interrelated. Only by involving the public will water quality goals in the Rio Pueblo de Taos Watershed be created, implemented and achieved while maintaining the rich cultural and ecological integrity of the area.

The Rio Pueblo de Taos Watershed Group is open to the general public and all stakeholders are encouraged to attend meetings. Meetings are held on a monthly basis in a common location centrally located within the watershed. All meeting activities and minutes are recorded by a facilitator from Amigos Bravos and distributed through mail or email to members of the community who expressed an interest in the project and those who attend the group meetings. Meeting structure is determined by an agenda loosely defined by public input in the preceding meeting and the *Rio Pueblo de Taos Action Stakeholder Initiative* plan. Local newspapers and radio stations print and broadcast meeting dates, times and locations. Public participation is an ongoing effort. Identification and contact with additional stakeholders remains a priority task for the Rio Pueblo de Taos Watershed Group.

IV. Watershed Description

A. Land Use- The Rio Pueblo de Taos Watershed is located in Taos County in north-central New Mexico within the Upper Rio Grande, or Hydrologic Unit Code (HUC) 13020101. The Rio Pueblo de Taos Watershed covers an area of land draining approximately 400 square miles, entering the Rio Grande at its confluence near Taos Junction upstream from Pilar. Its tributaries include the Rio Chiquito, Rita de la olla, Rio Fernando de Taos, Rio Grande del Rancho and Rio Lucero. The watershed has a rich set of diverse cultural and natural resources, which provide for a unique area in which the land and water are interconnected. Managing the river and the adjacent land is a complex endeavor encompassing a diverse range of stakeholders.

Figure 1: Land status of Rio Pueblo de Taos Watershed



Source: New Mexico Environment Department (Skinner, 2005)

The Rio Pueblo de Taos begins and ends flowing through Taos Pueblo lands, comprising 56% of the watershed. In between, it flows through the Town of Taos and Taos County, including private landholdings, making up 14% of the land, and public lands managed by the Bureau of Land Management (BLM) and headwater tributaries to the east managed by the Carson National Forest of the United States Forest Service (USFS), which comprise of 30% of land in the watershed. Land use in the Rio Pueblo de Taos watershed is 78% forest, 9% agriculture, 7% rangeland, 5% built-up lands and 1% barren tundra (NMED, 2004).

B. Geology- The northern boundary of the watershed's geology consists of Precambrian igneous, metamorphic and sedimentary rocks. As the Rio Pueblo de Taos flows southwesterly, it leaves sedimentary rock formations from the Pennsylvanian period of the Paleozoic era in the Sangre de Cristo formation, and enters alluvial gravels deposited in the Quaternary period from the Cenozoic era. These Quaternary deposits are important areas for groundwater recharge. "Quaternary deposits in the Taos area generally are unconsolidated, make up the shallow aquifers, and provide areas for ground water recharge" (Bauer et al. 1999).

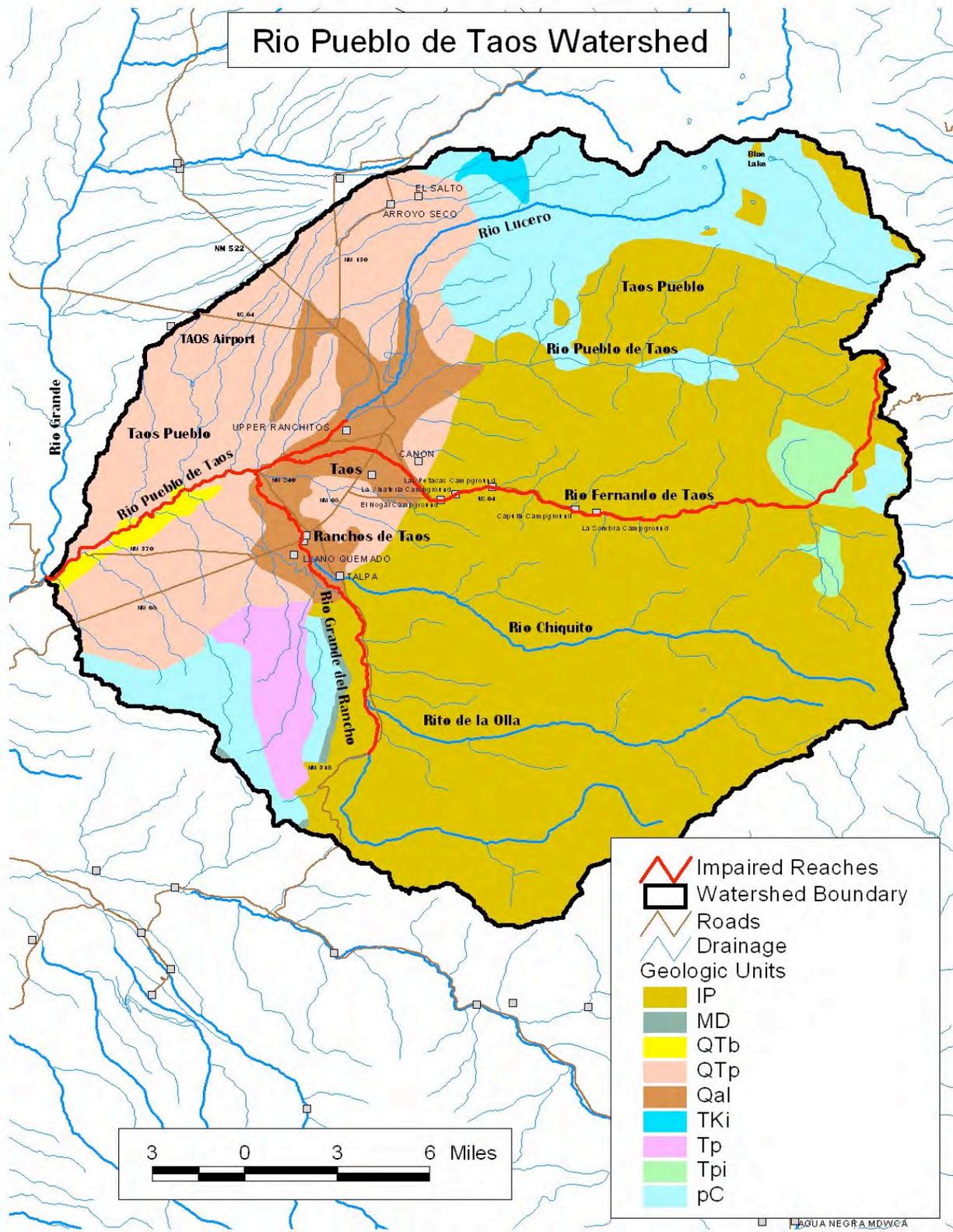
The valleys containing fluvial sediments along the Rio Grande del Rancho, Rio Chiquito, Rio Pueblo de Taos and Rio Fernando de Taos are areas of primary importance due to their critical role in providing shallow aquifer recharge. These areas have also been subject to land use practices that have affected both surface and ground water quality and quantity.

The eastern flank of the watershed boundary, the Sangre de Cristo Mountains, parallels the sinuous fault patterns of the Rio Grande rift. As the river flows west and enters the Rio Pueblo de Taos gorge, it flows through igneous and metamorphic mantle-derived basalt rocks that were exposed from volcanic activity during the Cenozoic era, before joining the Rio Grande.

C. Topography- The Rio Pueblo de Taos begins in a high alpine environment nearly 13,000 feet above sea level, near Blue Lake. It flows south and westerly through a steep, forested mountain canyon, mountain valleys, piedmont and outwash plains and a gorge cut through basalt layers. It reaches the mighty Rio Grande approximately 30 miles from its headwaters and 7,000 feet below where it begins.

The Rio Pueblo de Taos Watershed belongs to the Southern Rocky Mountain Physiographic Province. This can be characterized by three broad geomorphic categories: 1) the Sangre de Cristo Mountains; 2) westward sloping alluvial piedmont plains and alluvial fans; and 3) basalt areas. The Sangre de Cristos to the east, drain primarily to the west and southwest.

Figure 2: Geology of Rio Pueblo de Taos Watershed



Source: New Mexico Environment Department (Skinner, 2005)

Table 1: Legend for Geologic Units

IP	Undivided Pennsylvanian sedimentary rocks- consists chiefly of poorly exposed, olive, brown, red, and dark gray shale and siltstone plus fine- to coarse-grained sandstone with lesser amounts of conglomerate and limestone
MD	Mississippian- quartz sandstone, local quartzite conglomerate, siltstone, and shale
QTb	Basaltic and andesitic volcanics interbedded with Pleistocene and Pliocene sedimentary units
QTp	Older piedmont alluvial deposits and shallow basin fill
Qal	Stream channel and valley-floor alluvium, and active floodplains (Holocene)- poorly to well-sorted, poorly sorted sand, pebbles, and boulders
TKi	Paleogene and Upper Cretaceous intrusive rocks
Tp	Picuris Formation, undivided (Oligocene)- light gray to pinkish gray, immature, pumice-rich conglomeratic sandstone
Tpi	Picuris Formation, upper member (Oligocene)- light gray to pinkish gray, immature, pumice-rich, sandstone. Consists mainly of sandstones with gravel-sized clasts of pumice and silicic volcanic rocks and minor Precambrian quartzite and intermediate composition volcanic rocks
pC	Precambrian igneous, metamorphic and sedimentary rocks

Source: Bauer and Kelson, 2003; Skinner, 2005

“Drainage is generally westward through the dissected alluvial plains into the Rio Grande” (Hacker et. al. 1976). West of the mountains are the piedmont plains and alluvial fans. The slope is generally steep in the eastern mountains of the Sangre de Cristos and lessens as one moves westward in the watershed, both losing altitude and moving through well-defined drainages.

D. Soils- The soils in the Rio Pueblo de Taos Watershed range from deep soils in alluvial fans, dunes, terraces and valleys, at an elevation up to 8,000’ that support native vegetation that includes short-mid grasses, shrubs and scattered trees, to deep soils on high mountains, formed in alluvium, colluvium, and residuum, that support native vegetation including mid grasses, shrubs, ponderosa pine, Douglas fir, white fir, Engelmann spruce and sub-alpine fir at the higher elevations in the watershed up to 13,000’. In between, there are shallow soils on basalt mesas, formed from basalt, in eolian sediment and mixed alluvium, which support grasses, shrubs, piñon and juniper at mid-elevations of 6,500’ – 10,000’, to moderately deep to deep soils on dissected piedmonts, mountainsides, alluvial fans and terraces formed from mixed alluvium, colluvium, and residuum that support native vegetation including mid grasses, shrubs, juniper, piñon and ponderosa pine, Douglas fir and white fir at elevations of 6,800’ – 9,800’ (Hacker et. al. 1976).

E. Climate- The climate of the Rio Pueblo de Taos Watershed, the Taos area, and northern New Mexico varies greatly with regard to both precipitation and temperature. “The effects of mountains, elevation, and different north-south weather patterns create a mosaic of arid to sub-humid climates” (Johnson, 2001). Located in the interior of the North American continent along the southernmost tip of the Southern Rockies, Taos has a typical continental climate with significant daily and seasonal temperature gradients. Winters are typically cold and summers are moderate in temperature. Most of the precipitation that reaches the area comes from mid-latitude westerlies from the Pacific, however seasonal variations occur with air masses from the Gulf of Mexico to the southeast also bringing significant precipitation to the area (Whiteman, 2000). Annual precipitation for the town of Taos is averaged over 90 years at 12.29 inches annually (Western Regional Climate Center, 2004). This varies drastically however, between the high alpine environs of the watershed and the lower sagebrush mesas. The Sangre de Cristo range to the north and east of the watershed may receive over 35 inches of precipitation annually, most of it in the form of snow (U.S. Department of Agriculture, 1990). Seasonal variations come in two distinct patterns: winter storms occurring from November to March, and summer monsoons occurring from July to September. Northern Pacific storms tracking over California to the west provide low-moderate intensity storms that result in low elevation rain and high elevation snow showers during the winter storm cycle. These winter storms supply up to 30% of the annual precipitation and supply groundwater recharge from spring snowmelt, which runs off, infiltrating shallow aquifers and replenishing flow to the area’s surface water in the spring. Monsoonal storms in the summer months are a result from moisture-laden air masses coming northward from both the Gulf of California and the Gulf of Mexico. As southeasterly flow from the Gulf of Mexico brings moisture inland, surface heating over land and orographic lifting over the mountain fronts causes brief, frequent and intense storms. This seasonal pattern varies over time. Periods of drought have plagued the Southwest for as long as climatic data has been kept. Tree ring research suggests drought is normal for this part of the continent.

F. Hydrology- The watershed’s surface water consists of three major perennial tributaries and many smaller ephemeral ones. The Rio Lucero to the north, originates slightly north of Blue Lake on Taos Pueblo lands, and joins the Rio Pueblo de Taos at the southern most boundaries of Taos Pueblo. The Rio Fernando de Taos begins to the east, in the Sangre de Cristo Mountains on the Carson National Forest land holdings, and flows westerly through several

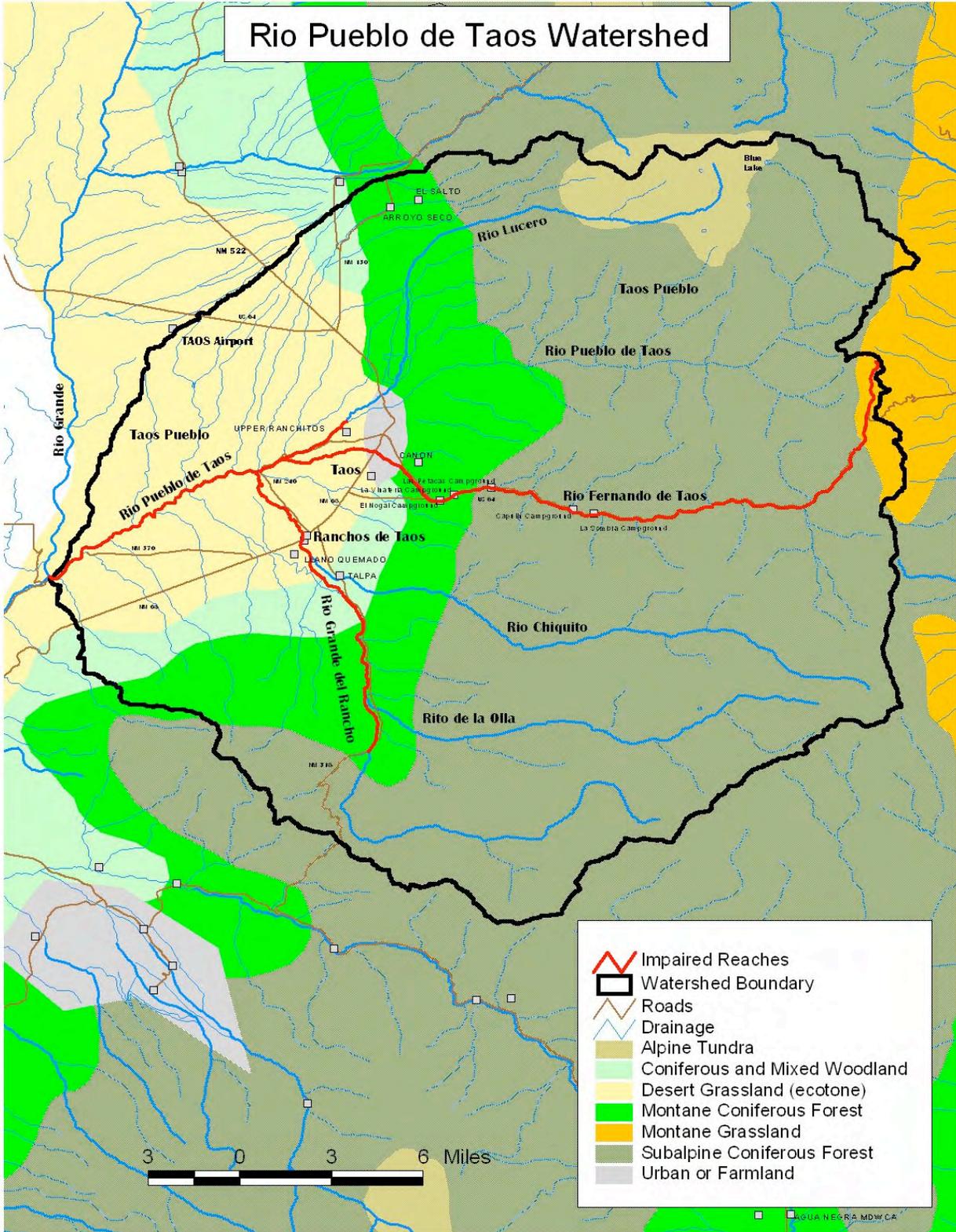
unincorporated communities in Taos Canyon, Cañon and the town of Taos. The Rio Chiquito and Rita de la Olla both join the Rio Grande del Rancho after flowing west from the Carson National Forest and joining the Rio Grande del Rancho in the community of Talpa. The Rio Grande del Rancho continues through Ranchos de Taos and joins the Rio Pueblo de Taos in the village of Los Cordovas. These surface waters are interconnected to the ground water of the Taos area. Quaternary deposits of fluvial sands and gravel allow groundwater recharge to shallow aquifers. In addition, “mountain-stream channel and arroyo-channel recharge are known to be important mechanisms of mountain-front recharge to the ground water systems” (Bauer et al. 1999). Ground water also supplies base-flow to the Rio Pueblo de Taos through accretion at several points along the main stem, although there is mounting concern about municipal and domestic wells drawing down the aquifer and resulting in less water being discharged to the river. Reduced flow has a significant impact on water quality as reduced flow situations often cause a concentration of contaminants. The Rio Pueblo de Taos, as part of the Upper Rio Grande, provides water resources to the rest of the state and to Texas and Mexico.

G. Vegetation- The Rio Pueblo de Taos watershed is composed of 6 primary vegetation types. Near its headwaters, the Rio Pueblo de Taos watershed is characterized as alpine tundra and montane grasslands. As the river flows south and west, it enters a sub-alpine coniferous forest. Further west, and lower in elevation, it flows through montane-coniferous forests. Before the Rio Pueblo de Taos flows through the town of Taos, it enters a coniferous and mixed woodland zone. West of the watercourse, the watershed is composed of both desert grasslands and great basin desert scrub.

It is important to note, however, that land use in the watershed has compromised land cover and native vegetation. Along the urban corridor of Paseo del Pueblo and other major roadways in the town of Taos and throughout Taos County, low and high intensity residential areas, along with commercial and industrial uses, have severely impacted the vegetative cover in the watershed.

H. Sociology- The Taos area has been continuously inhabited since 900 AD. Taos Pueblo has served as a major indigenous trade and travel stop from the mountains to the plains for hundreds of years. In the late 1500’s, Spanish conquistadors first explored the Taos valley. The early 1600’s brought Spanish settlers and missionaries to develop large plantations or *encomiendas*. Tensions rose as the Spanish sought to rule the Pueblo people until in 1680,

Figure 3: Vegetation of the Rio Pueblo de Taos Watershed



Source: New Mexico Environment Department (Skinner, 2005)

when the northern Pueblos, beginning with Taos, revolted and drove the Spanish out of northern New Mexico in what is known today as The Pueblo Revolt (Town of Taos, 1999). The Pueblo resisted Spanish efforts to re-conquer the Taos valley until 1715, when Spanish civil government was restored to what is now Taos and development occurred under the *Leyes de las Indias*, which prohibited encroachment of Pueblo lands. Settlement occurred in a *merced*, or land grant system, which gave title of lands to individuals (*suertes*) and communal (*ejidos*). In 1821, Mexico declared its independence from Spain and the Taos valley experienced significant changes in the Mexican constitution, which among other things, legalized trade with Americans. This brought an influx of American settlement to the area (Town of Taos, 1999).

In 1846, New Mexico was claimed a territory of the United States. However, there was much resistance to U.S. rule in the Taos Valley. In 1848, after the U.S.-Mexican War, New Mexico was ceded to the United States. In 1912, New Mexico became a state; however, statehood created major differences between Spanish and Mexican rule and the recent American rule. The Pueblo and Spanish land grants, which were recognized under Mexican rule and supposedly honored under the Treaty of Guadalupe Hidalgo, were turned over to federal control, sold to wealthy individuals, or outright stolen by greedy land speculators and lawyers. This has resulted in much litigation and contention over land grants that still remain to this day between land grant communities and the U.S. government (Town of Taos, 1999).

I. Taos Pueblo -Blue Lake and the Rio Pueblo de Taos are sacred to the Pueblo of Taos. Many religious ceremonies at the Pueblo occur along the Rio Pueblo de Taos and at its source, Blue Lake. In 1906 the watercourse and its watershed were taken from the Pueblo and placed under control of the United States Forest Service under supervision of the Carson National Forest. In 1970, after a 64-year struggle to regain their sacred lands and waters, Taos Pueblo elders successfully petitioned to have Federal House Bill 471 passed, which gave title to Blue Lake and the upper Rio Pueblo de Taos Watershed back to Taos Pueblo, thus ensuring the cultural survival and self-determination of a Pueblo way of life (Gordon-McCutcham, 1990). Today, the Pueblo is seeking water quality protection measures for the Rio Pueblo de Taos under the Clean Water Act (CWA).

Taos Pueblo, under section 518 of the CWA, may assume regulatory authority of certain programs. This right was established as an amendment in 1987 to the CWA allowing the U.S. Environmental Protection Agency (EPA) to treat Indian tribes as states, or similar to states

(TAS). Taos Pueblo, under section 518, may seek “primacy” from the EPA to administer and implement programs, including the implementation of more stringent water quality standards, within their borders (Royster, 1999). However, TAS is a recognition based on a case-by-case basis. TAS allows for applications of tribes to administer a CWA program, such as the National Pollution Discharge Elimination System (NPDES) permitting system, or apply for a variety of funding opportunities available to states (Cutler, 1999).

There are three basic requirements for tribes to be treated as states: the tribe must have an operational governing body; the tribe’s jurisdiction must fall within the realms of the specific program for which they are applying; and the tribe must be capable of administering and implementing the program for which they are applying (Royster, 1999). The second requirement, that of jurisdiction, has been contentious in that it places limits on the jurisdiction of tribes. In *Montana v. EPA*, an important decision defined this interpretation by the EPA. Federal court “authorizes tribes to exercise CWA program authority to the extent that the tribe would retain inherent governmental power to regulate those waters” (D. Montana, 1996). This decision promulgates that a tribe’s sovereignty and therefore, jurisdiction, extends to include all waters of the reservation (Royster, 1999).

Jurisdiction of tribal waters may often times, as in the case with inter-state waters, cross boundaries of jurisdictional primacy. The Pueblo of Isleta, downstream of Albuquerque on the Rio Grande, assumed primacy under section 518 of the CWA from the EPA. In doing so, they designated a use for the Rio Grande as “primary contact ceremonial use”, and with that, established water quality standards higher than those established by both the EPA and the state of New Mexico. This affected the City of Albuquerque as it operates a wastewater treatment facility upstream and holds a NPDES permit to discharge treated effluent into the Rio Grande. Faced with an expensive compliancy option, the city sued the EPA under the allegation that the EPA’s approval of Isleta Pueblo’s water quality standards was invalid. In 1996, the 10th circuit district court, in the case of *Albuquerque v. Browner*, found the EPA was correct in asserting its regulatory authority in accepting and enforcing Isleta’s standards. The district court’s holding was based on Isleta’s inherent tribal sovereignty to set criteria for water quality standards and the EPA’s assertion of authority in enforcing those standards against an upstream polluter. However, an important distinction was made determining it is not the tribes themselves who have authority to enforce their own standards rather it is the EPA’s responsibility to enforce

those standards as a responsibility under the trust doctrine (Kono, 2001). Under the trust doctrine, water, as an inherent element of land trust, is trust property and “the federal government has a duty to act in the best interest to protect land and water as trust assets in which Indians possess a beneficial interest” (Kono, 2001).

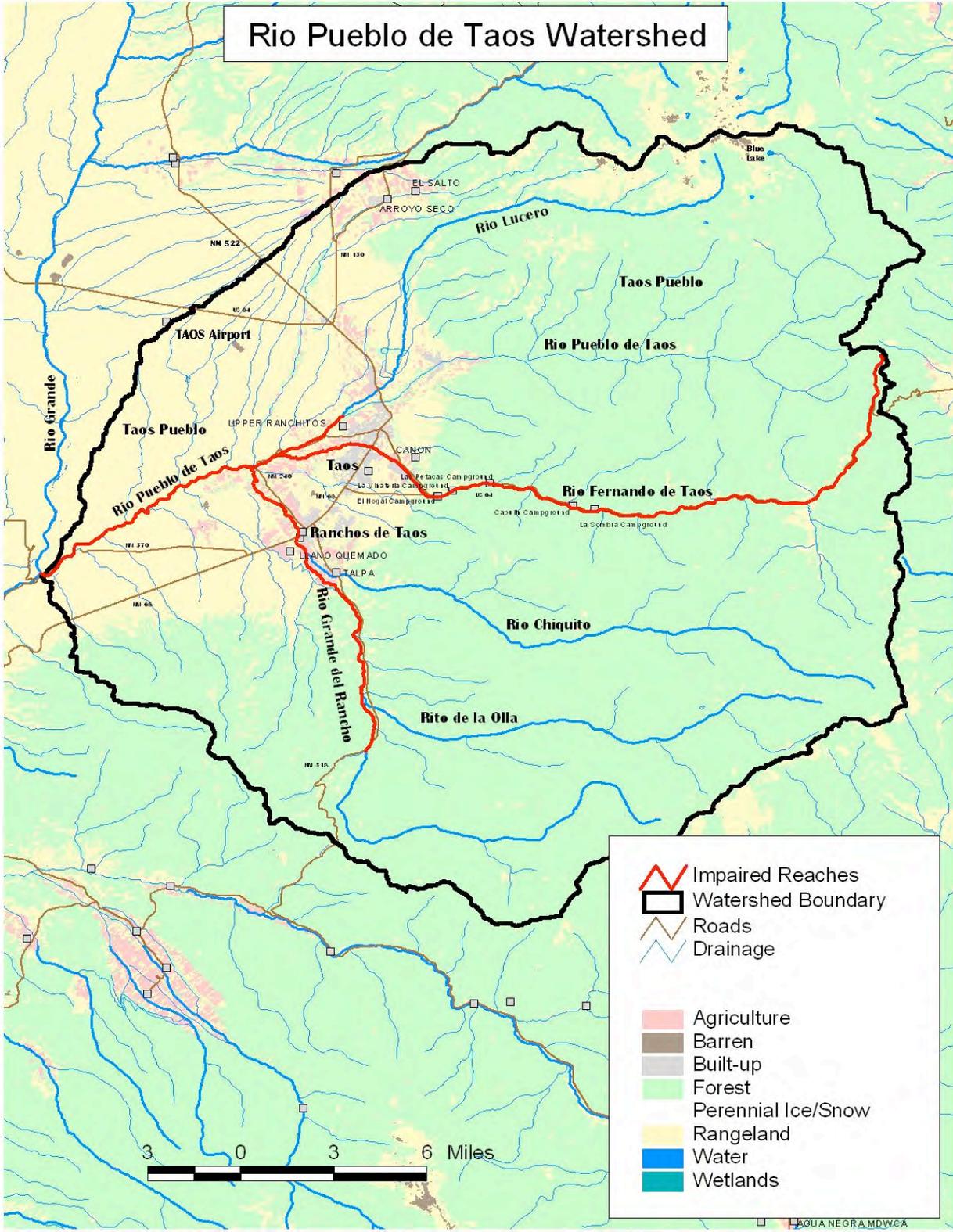
The precedent set in these two landmark decisions for Indian tribes empowers Taos Pueblo to establish and administer their own water quality standards for the Rio Pueblo de Taos Watershed. The issue is essential to consider in water quality and watershed-based land and water management issues within the Rio Pueblo de Taos watershed, as ultimately, the remaining stakeholders may have leverage for effective policy change, or be constrained by higher standards under Taos Pueblo’s intentions of establishing their own water quality standards in the Rio Pueblo de Taos.

J. Spanish traditions: Acequias - As the Rio Pueblo de Taos flows beyond the boundaries of Taos Pueblo, it becomes an arterial waterway for Spanish acequia systems, or irrigation ditches. When the first Spanish settlers arrived in the Taos Valley, they built small communities along the Rio Pueblo de Taos and engineered a complex irrigation system, modeled both after irrigation ditches at Taos Pueblo and those of the Old World that incorporated agricultural, economic, political, religious and social systems into the development and implementation of the acequia, considered to be the backbone of traditional Spanish culture in New Mexico to this day (Rivera, 1998).

Surface water diverted from the Rio Pueblo de Taos and its’ tributaries in the watershed provide water to the acequias which transport it to fields for crops. More than 400 years after the first acequia system in Taos was developed, over 22 ditch associations still thrive along the Rio Pueblo de Taos, providing irrigation water to traditional farmers and ranchers throughout Taos and the outlying rural villages of Ranchos de Taos and Los Cordovas (Potter, 2001).

K. Contemporary Uses - As the Rio Pueblo de Taos leaves its slow-meandering path through the pastoral landscape of Los Cordovas, it enters a steep basaltic canyon, increasing its gradient as it tumbles through pool-drop formations for several miles until it reaches the Rio Grande confluence northwest of Pilar. State Road 570, the former road to Carson, used to accompany the Rio Pueblo de Taos along its descent through the canyon until 1990 when a landslide obstructed the roadway. This stretch of river is bordered on the west by Taos Pueblo

Figure 4: Land Cover in the Rio Pueblo de Taos Watershed



Source: New Mexico Environment Department (Skinner, 2005)

and to the east by BLM and private land holdings. Along this lower stretch of river, much like in the eastern watershed of the Carson National Forest, more contemporary recreational uses such as boating, fishing and hiking predominate the land and water uses of the Rio Pueblo de Taos Watershed. On the private lands adjacent to the Rio Pueblo de Taos, large-scale development threatens the open space and idyllic nature of the canyon rim and the land and water quality of the lower Rio Pueblo de Taos Watershed.

The Rio Pueblo de Taos Watershed hosts a variety of modern land and water uses in addition to cultural and domestic uses at Taos Pueblo and traditional acequia irrigation on Pueblo lands and other areas of the watershed. The river is a trout fishery to anglers, hosts bird watchers for its abundant bird diversity along its riparian areas and wetlands in Fred Baca Park, is home to one of the Southwest's most notoriously difficult class V whitewater kayak runs in the lower gorge, and has camping, hiking and Off highway vehicle (OHV) trails throughout the national forest lands in the Carson. In addition, there are grazing and timber harvest permits issued by the Carson National Forest for their land holdings and commercial, domestic and industrial uses in the Town of Taos and Taos County. Because of the area's outstanding aesthetic qualities people are drawn to the area and a thriving art and tourist economy has flourished.

V. Water Quality and Land-use Problems

In 2000, the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) conducted a watershed survey of the Upper Rio Grande Watershed, from Pilar, NM to the New Mexico-Colorado border. Tributaries were evaluated to determine exceedences in water quality and their impact in the watershed. As a result of this comprehensive evaluation, the Rio Pueblo de Taos was found to exceed water quality standards in all seven sub-segments of the Rio Pueblo de Taos and its tributaries.

Water quality standards (WQS) "define the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses" (40 CFR 131.2). Designated uses are human uses and ecological conditions that are officially recognized and protected. The designated uses for the Rio Pueblo de Taos from its mouth on the Rio Grande upstream to the confluence with the Rio Grande del Rancho include: coldwater aquatic life, fish culture, irrigation, livestock watering, primary contact, and wildlife habitat. The designated uses for all other stretches and tributaries of the Rio Pueblo de

Taos include: high quality coldwater aquatic life, domestic water supply, fish culture, livestock watering, wildlife habitat and secondary contact. The Clean Water Act (CWA) requires that these uses be protected and maintained.

New Mexico’s 303(d)/305(b) report lists impairment of the coldwater aquatic life and high quality coldwater aquatic life uses in the Rio Pueblo de Taos. The probable causes of this impairment include sedimentation/siltation, temperature, and specific conductance. As a result of impairment of the Rio Pueblo de Taos Total Maximum Daily Loads (TMDLs) for temperature were established for the following stream segments: Rio Grande to Arroyo del Alamo; Arroyo del Alamo to Rio Grande del Rancho; Rio Grande del Rancho to headwaters; Rio Fernando de Taos from the Rio Pueblo de Taos to headwaters. TMDLs for stream bottom deposits (SBDs) along the Rio Pueblo de Taos were developed for the Arroyo del Alamo to Rio Grande del Rancho stream segment. TMDLs for specific conductance were developed for the Rio Fernando de Taos from the Rio Pueblo de Taos to headwaters and for the Rio Grande del Rancho from the Rio Pueblo de Taos to Hwy 518 (NMED, 2004).

Table 2: Rio Pueblo de Taos Segment and Probable Cause & Source of Impairment

Stream segment	Probable cause of impairment	Probable source of impairment
Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)	Temperature, water	Flow alterations from water diversions, habitat modification – other than hydromodification, other recreational pollution sources, rangeland grazing
Rio Pueblo de Taos (Arroyo del Alamo to Rio Grande del Rancho)	Sedimentation/siltation Temperature, water	Crop production (crop land or dry land), highway/road/bridge runoff (non-construction related), highway/road/bridges, infrastructure (new construction), rangeland grazing
Rio Pueblo de Taos (Rio Grande del Rancho to Taos Pueblo Boundary)	Specific conductance Temperature, water	Habitat modification – other than hydromodification, loss of riparian habitat, rangeland grazing, source unknown
Rio Fernando de Taos (Rio Pueblo de Taos to headwaters)	Specific conductance Temperature, water	Highway/road/bridge runoff (non-construction), irrigated crop production, natural sources, other recreational pollution sources, rangeland grazing, source unknown, streambank modification/destabilization
Rio Grande del Rancho (Rio Pueblo de Taos to HWY 518)	Specific conductance	Flow alterations from water diversions, habitat modification – other than hydromodification, highways/roads/bridges, infrastructure (new construction), natural sources, streambank modification/destabilization

Source: New Mexico Environment Department (NMED, 2004)

Water quality exceedances, along with probable causes and sources of impairment, were identified by the NMED in the 2004-2006 303(d)/305(b) report for the Rio Pueblo de Taos. Total Maximum Daily Load (TMDL) reports for the Rio Pueblo de Taos identify a number of probable sources of these causes of impairment. In addition to potential point-source pollution, including municipal discharges from a wastewater treatment facility and a golf course, the TMDL identifies numerous sources of non-point source (NPS) pollution. These include agriculture, bank or shoreline modification/destabilization, construction, crop related sources, flow regulation/modification, grazing related sources, highway/road/bridge maintenance/runoff, habitat modification, hydromodification, infrastructure, irrigated crop production, land disposal, rangeland grazing, recreation and tourism activities, removal of riparian vegetation, sedimentation/siltation, septic systems, specific conductance, temperature, and urban runoff/storm sewers (NMED, 2004).

Table 3: TMDLs for the Rio Pueblo de Taos

Stream Segment	TMDL
Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)	Temperature
Rio Pueblo de Taos (Arroyo del Alamo to Rio Grande del Rancho)	Temperature, SBD
Rio Pueblo de Taos (Rio Grande del Rancho to headwaters)	Temperature
Rio Fernando de Taos (Rio Pueblo de Taos to headwaters)	Temperature, Specific-conductance
Rio Grande del Rancho (Rio Pueblo de Taos to HWY 518)	Conductivity

Source: New Mexico Environment Department (NMED, 2004)

There are two documented dischargers in the watershed. These discharges have three discharge permits associated with them:

1. Town of Taos Wastewater Treatment Plant

- NPDES Permit No. NM0024066 – administered by the Environmental Protection Agency with input from the New Mexico Environment Department. From 2000 until present, the EPA has noted a series of ongoing violations to the Town of Taos for incomplete reporting in their Discharge Monitoring Reports (DMRs).
- NMED Municipal-wastewater Groundwater Discharge Permit No. 2836 – administered by the Groundwater Bureau of the New Mexico Environment Department.

2. Taos Country Club

- NMED Municipal-wastewater Groundwater Discharge Permit No. 2718 - administered by the Groundwater Bureau of the New Mexico Environment Department.

To pinpoint some of the specific contributors to the impairment of the river and the watershed, the Rio Pueblo de Taos Watershed Group participants divided the Rio Pueblo de Taos into seven sections and identified the following concerns and potential water quality issues relating to land use and water quality in the watershed. Potential restoration needs and projects, in addition to key stakeholders and potential partners, were also identified.

Table 4: Segment One (1) of the Rio Pueblo de Taos-confluence with Rio Grande to wastewater treatment plant

Location	Potential Water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
Eastern rim of the Segment	Exurban development along the Rio Pueblo de Taos rim	Land ordinances, conservation easements	Amigos Bravos, Taos County, Taos Land Trust, Town of Taos
Golf course	Runoff, pesticides	Assessment of extent of this potential problem.	Taos Country Club
SR 570	Runoff from road	BMPs implemented, Bio-filters, Re-grading shoulder of road	Amigos Bravos, BLM, NMDOT, Private landowners, Village of Pilar
SR 570	Lead contamination from unregulated shooting ranges	Better enforcement of unregulated shooting ranges, Clean-up of lead, Signs asking people to pick up bullets and bullet casings, Educational material at sporting goods stores	Community members, Taos County, Sporting goods stores
Whole Segment	Off highway vehicle (OHV) use in riparian zone	Fencing, Signage	Amigos Bravos, BLM, Community members, Private landowners, Village of Pilar
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private Landowners, Quivira Coalition
Whole Segment	Denuded landscape and overgrazing, Erosion	Cattle exclosures	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, BLM, Community members, Native Plant Society of Taos,

			Quivira Coalition
Whole Segment	Spread of invasive, non-native plant species	Salt cedar and Russian Olive removal, potential removal of other invasive flora	Amigos Bravos, BLM, Community members, Native Plant Society of Taos, Taos Noxious Weed Committee, Quivira Coalition
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county-wide to decrease draw-down on the aquifer	Community members, NRCS, Private landowners, TVAA
Whole Segment	Stormwater runoff from existing development and new development	Catchment basins, Bio-filters, Mechanical filters, Demonstration projects, Ordinances for new development, Incentives for already existing development, Informative signs, Education	Amigos Bravos, Construction industry, Developers, NMED, Taos County, Town of Taos
Whole Segment	Stormwater runoff from construction sites	Monitoring to make sure that construction sites have adequate Stormwater Pollution Protection Plans (SWPPPs), Education for contractors to make sure that they are aware of Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	Amigos Bravos, Construction industry, Developers, EPA, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Salt and sedimentation from roads	Road salt alternatives	NMDOT, Taos County, Town of Taos
Whole Segment	Septic tanks	Project to get septic tanks online to the Waste Water Treatment Plant	Community members, NMED, Private landowners, Taos County, Town of Taos
Whole Segment – especially at end of SR 570	Old dump sights, New trash	River clean-up, Draft close-out plans for dump sites, Ordinances for waste disposal, Subsidies for removing appliances, Project with Taos Search and Rescue to pull up large trash items from bottom of canyon	Amigos Bravos, Community members, Taos County Waste Disposal, Taos Search and Rescue, RMYC
Wastewater Treatment Plant (WWTP)	Polluted groundwater from past and present WWTP activities leaching into river	Assessment to determine if this is a problem and extent	NMED, Town of Taos, WWTP

Table 5: Segment Two (2) of the Rio Pueblo de Taos-Wastewater Treatment Plant to Rio Pueblo de Taos confluence with Rio Fernando

Location	Potential water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
Lower Ranchitos Rd.	Channeling, Filling of riparian areas with debris	Induced meandering, Constructed wetlands, Ordinances	Amigos Bravos, Community members, Private landowners, Quivira Coalition, Taos County, Town of Taos
Maestas Rd.	Development along arroyo	Ordinances to control development and it's impact on watershed.	Amigos Bravos, Private landowners, Taos County, Town of Taos
Ranchitos Rd. and Paseo del Pueblo Norte	Runoff from new car wash spilling into river	Work with car wash to improve drainage.	Car wash owners, NMED
Thomas Romero Rd.	Old dump sights	Clean-ups, Draft close-out plans for dump sites, Ordinances for waste disposal, Subsidies for removing appliances, Project with Taos Search and Rescue to pull up large trash items from bottom of canyon	Amigos Bravos, Community members, Taos County Waste Disposal, Taos Search and Rescue
Whole Segment	Salt and sedimentation from roads	Road salt alternatives	NMDOT, Taos County, Town of Taos
Whole Segment	Septic tanks	Project to get septic tanks online to the Waste Water Treatment Plant	Community members, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county-wide to decrease draw- down on the aquifer, develop domestic well bill	Community members, NRCS, Private landowners, Taos County, Town of Taos, TVAA
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Stormwater runoff from existing development and new development	Catchment basins, Bio-filters, Mechanical filters, Sediment traps, Demonstration projects, Incentives for existing development, Ordinances for new development	Amigos Bravos, Construction industry, Developers, NMED, Taos County, Town of Taos
Whole Segment	Stormwater runoff from construction sites	Monitoring to make sure that construction sites have adequate Stormwater	Amigos Bravos, Construction industry, Developers,

		Pollution Protection Plans (SWPPPs), Contractor education on Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	EPA, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Denuded landscape and overgrazing, Erosion	Cattle exclosures	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, Community members, Native Plant Society of Taos, Quivira Coalition

Table 6: Segment Three (3) of the Rio Pueblo de Taos - confluence with Rio Fernando to confluence with Rio Lucero

Location	Potential water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
SR 585	Salt and sedimentation from culverts/roads	Road salt alternatives, Re-grading of roads/installation of new culverts	NMDOT, Taos County, Town of Taos
Whole segment	Filling-in of arroyos to build	Ordinances	Developers, Private landowners, Taos County, Town of Taos
Whole Segment	Septic tanks	Project to get septic tanks connected to the Wastewater Treatment Plant	Community members, Developers, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Loss of wetlands	Riparian ordinances, Riparian buffers, Induced meandering	Amigos Bravos, Community members, Quivira Coalition, RMYC, Taos County, Town of Taos
Whole Segment	Run-off from gas stations	Education, BMPs installed	Community members Station owners
Whole Segment	Old dump sights, Illegal dump sights	Clean-ups, Education, Create better legal waste disposal opportunities	Amigos Bravos, Community members, RMYC, Taos County Waste Disposal
Whole Segment	Stormwater runoff from existing and new development	Catchment basins, Bio-filters, Mechanical filters, Demonstration projects, Ordinances for new development, Incentives for existing development, Informative signs, Education	Amigos Bravos, Construction industry, Developers, NMED, Taos County, Town of Taos
Whole Segment	Stormwater runoff from	Monitoring to make sure that	Amigos Bravos,

	construction sites	construction sites have adequate Stormwater Pollution Protection Plans (SWPPPs), Contractor education for awareness of Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	Construction industry, Developers, EPA, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Salt and sedimentation from roads	Road salt alternatives	NMDOT, Taos County, Town of Taos
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county-wide to decrease draw-down on the aquifer, Develop domestic well bill	Community members, NRCS, Private landowners, Taos County, Town of Taos, TVAA
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Denuded landscape and overgrazing, Erosion	Cattle exclosures	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, Community members, Native Plant Society of Taos, Quivira Coalition

Table 7: Segment Four (4) of the Rio Lucero- confluence with Rio Pueblo de Taos to Taos Pueblo boundary

Location	Potential water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
Whole Segment	Car washing in the river	Public outreach and education, Tree planting or fencing	Amigos Bravos, Community members, Taos County, Town of Taos
Whole Segment	Salt and sedimentation from culverts and roads	Road salt alternatives, Re-grading of roads, Installation of new culverts	NMDOT, Taos County, Town of Taos
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county-wide to decrease draw-down on the aquifer	Community members, NRCS, Private landowners, TVAA
Whole Segment	Septic tanks	Project to get septic tanks online to the Wastewater Treatment Plant	Community members, Developers, Private landowners, Taos

			County, Town of Taos
Whole Segment	Loss of wetlands	Riparian ordinances, Riparian buffers, Tree and willow planting, Induced meandering	Amigos Bravos, Community members, Quivira Coalition, RMYC, Taos County, Town of Taos
Whole Segment	Run-off from gas stations	Education, BMPs installed	Community members, Station owners
Whole Segment	Old dump sights, Illegal dump sights	Education, Create better legal waste disposal opportunities	Amigos Bravos, Community members, Taos County Waste Disposal
Whole Segment	Stormwater runoff from existing and new development	Catchment basins, Bio-filters, Mechanical filters, Demonstration projects, Ordinances for new development, Incentives for already existing development, Informative signs, Education	Amigos Bravos, Construction Industry, Developers, NMED, Taos County, Town of Taos
Whole Segment	Stormwater runoff from construction sites	Monitoring to make sure that construction sites have adequate Stormwater Pollution Protection Plans (SWPPPs), contractor education of Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	Amigos Bravos, Construction industry, Developers, EPA, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, Community members, Native Plant Society of Taos, Quivira Coalition
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Denuded landscape and overgrazing, Erosion	Cattle exclosures	Amigos Bravos, Community members, Private landowners, Quivira Coalition

Table 8: Segment Five (5) of the Rio Pueblo de Taos- confluence with Rio Lucero to Taos Pueblo boundary

Location	Potential water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
Whole Segment	Salt and sedimentation from culverts and roads	Road salt alternatives, Re-grading of roads, Installation of new culverts	Taos County, Town of Taos, NMDOT
Whole Segment	Stormwater runoff from existing development and new development	Catchment basins, Bio-filters, Mechanical filters, Demonstration projects, Ordinances for new development, Incentives for already existing development, Informative signs, Education	Amigos Bravos, Construction industry Developers, NMED, Taos County, Town of Taos
Whole Segment	Urban development	Ordinances to control development and its impact on the watershed	Amigos Bravos, Community members, Taos County, Town of Taos
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county wide to decrease draw down on the aquifer	Community members, NRCS, Private landowners, TVAA
Whole Segment	Septic tanks	Project to get septic tanks online to the Wastewater Treatment Plant	Community members, Developers, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Stormwater runoff from construction sites	Monitoring to make sure that construction sites have adequate Stormwater Pollution Protection Plans (SWPPPs), Contractor education on Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	Amigos Bravos, Construction Industry, Developers, EPA, NMED, Private landowners, Taos County, Town of Taos
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, Community members, Native Plant Society of Taos, Quivira Coalition
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Denuded landscape and overgrazing, Erosion	Cattle exclosures	Amigos Bravos, Community members, Private landowners, Quivira Coalition

Segment 6: Rio Lucero and Rio Pueblo de Taos on Taos Pueblo

Taos Pueblo, as a member of the Rio Pueblo de Taos Watershed Group, has participated in the drafting of this WRAS. Taos Pueblo is currently in the process of establishing their own 319 non-point source pollution program and will, under that program, investigate and address potential sources of the pollution and restoration projects on this stretch of the Rio Pueblo de Taos.

Table 9: Segment Seven (7) of the Rio Pueblo de Taos- Upper watershed tributaries: Rio Fernando, Rio Grande del Rancho, etc.

Location	Potential water quality/land-use issue(s)	Potential restoration needs & projects	Key stakeholders & potential partners
Carson National Forest	Forest thinning	BMPs	Carson National Forest, RMYC
Headwater streams	Sedimentation from Off highway vehicle (OHV) use	Education, Enforcement, Barriers, Signs	Amigos Bravos, Carson National Forest, Community members, RMYC
Rio Fernando	Salt and sedimentation from culverts and roads	Road salt alternatives, Re-grading of roads, Installation of new culverts	Carson National Forest, NMDOT, Taos County
Rio Fernando – cattle enclosure right before the horseshoe turn at the top of Taos Canyon	Sediment loading and bank destabilization	Better enforcement of the cattle rotations, Installation of additional cattle enclosures	Carson National Forest, Private landowners
Rio Grande del Rancho	Disturbance and sedimentation from powerline installation	Reclamation of disturbed areas by planting trees	Carson National Forest, Kit Carson Electric Cooperative RMYC
Whole Segment	Run-off from gas stations	Education, BMPs installed	Community members, Station owners
Whole Segment	Old dump sights, illegal dump sights	River clean-up, Draft close-out plans for dump sites, Ordinances for waste disposal, Subsidies for removing appliances	Amigos Bravos, Carson National Forest, Community members, Private landowners, Taos County Waste Disposal
Whole Segment	Decrease in baseflow	Education to encourage more efficient irrigation practices and more efficient water use county-wide to decrease draw-down on the aquifer	Carson National Forest, community members, NRCS, Private landowners, TVAA
Whole Segment	Septic tanks	Project to get septic tanks connected to the Wastewater Treatment Plant	Community members, Developers, Private landowners, Taos County, Town of

			Taos
Whole Segment	Stormwater runoff from construction sites	Monitoring to make sure that construction sites have adequate Stormwater Pollution Protection Plans (SWPPPs), Contractor education on Phase II of EPA stormwater requirements, Town or county ordinances to control stormwater runoff	Amigos Bravos, Construction industry, Developers, EPA, NMED, Private landowners, Town of Taos, Taos County
Whole Segment	Loss of native riparian vegetation	Native riparian restoration; cottonwood and willow plantings	Amigos Bravos, Carson National Forest, Community members, Native Plant Society of Taos, Quivira Coalition
Whole Segment	Stream channelization	Induced meandering, Constructed wetlands	Amigos Bravos, Community members, Private landowners, Quivira Coalition
Whole Segment	Denuded landscape and overgrazing, erosion	Cattle exclosures	Amigos Bravos, Carson National Forest, Community members, Private landowners, Quivira Coalition
Whole Segment	Stormwater runoff from existing and new development	Catchment basins, Bio-filters, Mechanical filters, Demonstration projects, Ordinances for new development, Incentives for already existing development, Informative Signs, Education	Amigos Bravos, Construction Industry, Developers, NMED, Taos County

VI. Water Quality Goals

The Rio Pueblo de Taos Watershed Group wishes to restore the watershed to meet both quantitative and qualitative indicators of water quality. The New Mexico Environment Department (NMED) has established Total Maximum Daily Load (TMDL) parameters for impaired segments of the Rio Pueblo de Taos that have been identified in this Watershed Restoration Action Strategy (WRAS). Goals of the Rio Pueblo de Taos Watershed Group for water quality in the Rio Pueblo de Taos Watershed are to fully meet all of the designated uses listed in New Mexico Standards for Interstate and Intrastate Waters. The uses are listed in Table 10.

Table 10: TMDL Stream segments and Designated uses

Stream segment	Designated uses
Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)	Coldwater fishery, fish culture, irrigation, livestock watering, primary contact, wildlife habitat
Rio Pueblo de Taos (Arroyo del Alamo to Rio Grande del Rancho)	Coldwater fishery, fish culture, irrigation, livestock watering, primary contact, wildlife habitat
Rio Pueblo de Taos (Rio Grande del Rancho to headwaters)	domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, secondary contact, wildlife habitat
Rio Fernando de Taos (Rio Pueblo de Taos to headwaters)	domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, secondary contact, wildlife habitat.
Rio Grande del Rancho (Rio Pueblo de Taos to HWY 518)	domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, secondary contact, wildlife habitat.

Source: New Mexico Environment Department (NMED, 2004)

The goals of the Rio Pueblo de Taos Watershed Group represent a range of stakeholder interests in the watershed. They were created with input from both watershed residents and agency advisors working within the watershed. The Rio Pueblo de Taos Watershed Group plans future projects by defining the desired condition of the watershed, identifying an appropriate scale for the project, identifying constraints that may limit restoration efforts, and determines short and long-term goals with measurable criteria.

The Taos Pueblo Office of Environmental Protection has established criteria for water quality. The Pueblo is pursuing a designated use for the Rio Pueblo de Taos that exceeds the standard of “primary contact” because of their historic usage for drinking water. There are 15 monitoring stations along the Rio Pueblo de Taos that are used by the Pueblo’s environmental staff in addition to the locations monitored by the NMED. The Rio Pueblo de Taos Watershed Group hopes to work with Taos Pueblo to achieve water quality goals and a monitoring and evaluation plan that would be beneficial to both the upper and lower watershed and its residents.

New Mexico Department of Game and Fish (NMDG&F) funds Watershed Watch, a high school watershed education program that is administered through River Source. This program includes monitoring water quality and riparian health along the Rio Fernando de Taos, a Rio Pueblo de Taos tributary, by Taos High School students. This program supports both the need for education and outreach as well as providing volunteer monitoring in the watershed.

Qualitative and quantitative indicators of watershed health are utilized in the Watershed Watch

curriculum that may be beneficial in outlining bio-criteria for the Rio Pueblo de Taos Watershed Group's monitoring efforts. As the watershed group develops parameters for measuring watershed health, a monitoring program with assessment and evaluation protocols will be developed as well as a monitoring schedule.

As the group develops parameters for monitoring, designated uses will be evaluated, and uses other than those already established will be discussed. All goals for water quality will be evaluated by the group taking into consideration the diverse stakeholder interests within the watershed, the multiple value systems and uses.

VII. Action Plan and Implementation Schedule

A . Past activities - Past activities of the Rio Pueblo de Taos Watershed Group include a public workshop about the Clean Water Act (CWA), sponsored by Amigos Bravos, the Meridian Institute, and the New Mexico Environment Department (NMED). The workshop was attended by a broad range of agency officials, educators, non-governmental agency representatives, watershed residents, and private interest groups. In addition, watershed residents have conducted stream segment hikes in which stream impairments were identified and photo-documented for future use. Watershed group members set up informational tables at the end of July, 2005 during the Taos Fiestas and in mid-August at a large, local grocery store in efforts to contact watershed residents, solicit concerns and increase attendance in public meetings. A Rio Pueblo de Taos cleanup was organized at the end of July, 2005 in collaboration with the Bureau of Land Management (BLM) and local civil society groups. Another river cleanup was organized on the Rio Lucero at the end of August, 2005.

B. Current activities - Current activities of the Rio Pueblo de Taos Watershed Group include volunteer field trips to stream segments, outreach to local watershed education programs, such as Rivers and Birds fifth grade watershed education program, River Source's Clean Water Partners Program and Watershed Watch, and local schools.

C. Future activities - Plans for future activities include collaboration with local watershed education programs in area schools, creation and distribution of newsletters and fliers, field trips, identification of suitable restoration project locations, implementation of restoration projects, baseline assessments of impaired segments, monitoring of watershed conditions, continued outreach to all stakeholders in the watershed including the Town of Taos, Taos

County, watershed resident, acequia associations, continued outreach to Taos Pueblo War Chief Staff and Taos Pueblo Governor's Office in collaboration with the Taos Pueblo Office of Environmental Protection, outreach to other watershed groups in the region, public meetings and informational workshops, remediation project for impaired stretches, and river cleanups.

Section IV indicates stream segments with areas of concern and potential restoration activities and identification of key stakeholders. The Rio Pueblo de Taos Watershed Group identified Best Management Practices (BMPs) determined to mitigate known causes and sources of impairment to the water quality in the watershed. Potential practices include, but are not limited to:

- channel reconstruction methods such as maintenance of hydraulic connections and stream meander restoration
- in-stream practices such as boulder clusters, fish passages, fish structures, grade control measures, log/brush/rock shelters, migration barriers, tree cover, weirs or sills and wing deflectors
- non-native vegetation removal such as Russian olive and salt cedar eradication
- stream corridor measures such as livestock exclusion/management and riparian buffers
- streambank treatment such as bank shaping and planting, branch packing, brush mattresses, dormant post plantings, fiber roll, joint plantings, live cribwalls, live fascines, live stakes, log, rootwad, and boulder revetments, riprap, stone toe protection, tree revetments, vegetated gabions, and vegetated geogrids
- water management such as sediment basins and water level control
- watershed management techniques such as BMPs for agriculture, forests and urban areas, flow regime enhancement and streamflow temperature management

An integrated approach to the planning process for recommended actions will be comprehensive, coordinated, and include educational, financial and technical support from available sources. Working with private landowners, local government, state and federal agencies and non-governmental organizations, the Rio Pueblo de Taos Watershed Group will strengthen the community through a collaborative approach towards watershed management and restoration. By being inclusive and well coordinated, goals and objectives of the watershed group can be achieved with effective monitoring, evaluation and restoration projects.

In October, 2005, the Rio Pueblo de Taos Watershed Group prioritized on-the-ground activities. These included: 1) Salt cedar eradication; 2) trash clean-ups along the Rio Pueblo de Taos; and 3) investigating and passing ordinances and/or other regulations to protect the watershed, including stormwater protection site identification, and a potential demonstration site for best management practices (BMPs) (Appendix C).

A time frame for action planning will be determined by the Rio Pueblo de Taos Watershed Group for identified priority restoration projects in January of 2006. These projects will address mitigation of non-point source (NPS) issues identified in the Total Maximum Daily Load (TMDL).

VIII. Funding and Coordination

The Rio Pueblo de Taos Watershed Group is focused on a collaborative approach towards watershed restoration. In that spirit, the group will work to build partnerships in the community through coordinated efforts with agencies and organizations with existing funding as well as seek new funding sources for restoration endeavors. Utilizing the diverse range of backgrounds and expertise of watershed residents, the Rio Pueblo de Taos Watershed Group will document in-kind donations of labor, materials, equipment, etc., to obtain funding through matching funds grants. Potential sources for funding include, but are not limited to:

A. Federal

- Bring Back the Natives Grant Program
- Community-based Restoration Program
- Cooperative Endangered Species Conservation Fund
- Cooperative Forestry Assistance Programs
- Drinking Water State Revolving Fund
- Environmental Justice Collaborative Problem-Solving Cooperative Agreements
- Environmental Justice Small Grants Program
- Environmental Quality Incentives Program
- Five-Star Restoration Program
- Flood Mitigation Assistance Program
- Hazard Mitigation Grant Program
- Landowner Incentive Program (Non-Tribal)
- Migratory Bird Conservancy
- National Fish and Wildlife Foundation General Matching Grants
- National Wildlife Refuge Friends Group Grant Program
- Native Plant Conservation Initiative
- Nature of Learning Grants Program
- Non-point Source Implementation Grants (319 Program)
- Partners for Fish and Wildlife Program
- Presidents Environmental Youth Award
- Private Stewardship Grants Program
- Public Works and Development Facilities Program
- Pulling Together Initiative
- Science to Achieve Results
- State Wildlife Grant Program (Non-Tribal)

- Targeted Watershed Grants Program
- Transportation Equity Act for the 21st Century Funding Programs
- Urban and Community Forestry Challenge Cost-Share Grants
- Water Quality Cooperative Agreements
- Water and Waste Disposal Systems for Rural Communities
- Watershed Processes and Water Resources Program
- Wetlands Reserve Program

B. State and Local

- New Mexico Department of Game and Fish
- New Mexico State Legislature
- New Mexico Trout
- Taos Soil and Water Conservation District

C. Private Foundations and Businesses

- Cloudveil Grassroots Support Program
- Patagonia Environmental Grants Program: Water/Marine
- Rocky Mountain Elk Foundation
- Trout Unlimited

IX. Potential Partners and Ongoing Watershed Restoration Activities

A. Taos Pueblo- Taos Pueblo lands incurred a catastrophic wildfire in Encebado Canyon in July of 2003. The upper Rio Pueblo de Taos Watershed has suffered direct impacts from erosion, habitat loss, sedimentation/siltation, etc. The Pueblo is currently involved in restoration efforts in the upper Rio Pueblo de Taos Watershed in addition to water quality monitoring at eleven water quality sample locations along the Rio Pueblo de Taos and the Rio Lucero.

B. USFS Carson National Forest- The Carson National Forest has been conducting watershed improvement projects in the Rio Fernando de Taos Sub-watershed, also known as Taos Canyon, and its headwaters since 1955. The watershed has suffered severely from overgrazing and timber harvest. Mitigation for these activities included the Taos Canyon Watershed Improvement Project which consisted of mass re-vegetation efforts that were completed in 1962, and the Taos Canyon Riparian Enhancement Project, completed in 1988, which created in-stream structures, revetments and cattle and elk exclosures.

In response to the Rio Fernando de Taos being listed in the 1994 303(d)/305(b) report for not meeting the designated use of “high quality coldwater fishery”, the Carson National Forest conducted a watershed analysis in 1995 to determine if management practices were “effective in controlling sediment delivery to aquatic systems” (Kuykendall, 1995). In addition, causal relationships and specific problem areas were listed in the analysis. The 303(d)/305(b) report

listed probable causes and sources of impairment as erosion and loss of riparian habitat from overgrazing of livestock, roads and high-use recreational areas.

Turbidity data from spring runoff of 1995 did not show high Nephelometric Turbidity Unit (NTU) levels in the headwater tributaries. However erosion, causal sedimentation and siltation from road runoff was identified as a problem in the upper watershed. Loss of riparian vegetation was documented in the lower watershed from high-intensity recreational use. To mitigate these problems, best management practices (BMPs) were identified and implemented including cattle and elk exclosures in the upper watershed, in-stream structure installation with revetments, willow and rosebush plantings, road closures, road drainage improvements, and parking area improvements (NMED, 1994).

In 2004 a watershed assessment of the Rio Fernando de Taos and its tributaries was conducted by the Carson National Forest. The Taos Canyon Watershed Analysis was conducted because the watershed was listed as a “high priority” watershed by the U.S. Department of Agriculture Southwestern Regional Office, due to wildfire threat. Fieldwork was conducted to assess impacts from a Healthy Forest Restoration Act (HFRA) project in which forest thinning would be conducted.

C. Contractors and developers, businesses, landowners, neighborhood associations, watershed residents, etc.

The Rio Pueblo de Taos Watershed Group will, in addition to working with agencies and organizations, establish and maintain a working partnership with contractors and developers, businesses, landowners, neighborhood associations, watershed residents, and other interested parties with a stake in watershed health. Through our education and outreach campaigns, interested parties have been contacted and we will continue to include interested parties in the planning process. Private party contact information has not been listed because of respect for personal privacy.

D. Contact Information for Potential Rio Pueblo de Taos Watershed Group Partners

Amigos Bravos: Friends of the Wild Rivers
P.O. Box 238, Taos, NM 87571
505-758-3874 ph.
505-758-7345 fax
www.amigosbravos.org

Bureau of Land Management
Taos Field Office
226 Cruz Alta Rd.
Taos, NM 87571
(505)758-8851

Carson National Forest
226 Cruz Alta Rd.
Taos, NM 87571
(505)758-6200
(505)758-6213 (fax)
www.fs.fed.us/r3/carson/

Natural Resources Conservation Service
Taos Service Center
224D Cruz Alta Rd.
PO Box 1928
Taos, NM 87571
(505)758-3863
(505)758-7650 fax
www.nm.nrcs.usda.gov/contact/directory/fiel.html#Taos%20Service

New Mexico Department of Game & Fish
PO Box 25112
Santa Fe, NM 87504
(505) 476-8000
www.wildlife.state.nm.us/index.htm

New Mexico Department of Transportation
1120 Cerrillos Road
P. O. Box 1149
Santa Fe, NM 87504
www.nmshtd.state.nm.us

New Mexico Environment Department,
Surface Water Quality Bureau
1190 St. Francis Dr., Suite N2062
P.O. Box 26110
Santa Fe, New Mexico 87505
www.nmenv.state.nm.us/swqb/index.html

The Quivira Coalition
1413 Second Street, Suite 1
Santa Fe, New Mexico 87505
(505)820-2544
www.quiviracoalition.org

Rocky Mountain Youth Corps
P.O. Box 1960
Ranchos de Taos, New Mexico USA,
87557-1960
(505)751-1420
(505)751-1136 fax
<http://youthcorps.org/>

Rivers & Birds
PO Box 819
Arroyo Seco, NM 87514
(505)776-5200
(505)776-1197 fax
www.riversandbirds.org/

River Source
2300 West Alameda, Unit A6
Santa Fe, NM 87507
505-992-0726
505-989-1015 fax
www.riversource.net

Taos Country Club
54 Golf Course Drive
Rancho de Taos, NM 87557
(505)758-7300

Taos County Chamber of Commerce
PO Drawer I
Taos, New Mexico 87571
(505)758-3873
(505)758-3872 fax
www.taoschamber.com

Taos County Planning Department
105 Albright Street, Suite A
Taos, New Mexico 87571
(505)737-6440
(505)737-6449 fax
<http://taoscounty.org/>

Taos Pueblo Office of Environmental
Protection
PO Box 1846
Taos, NM 87571
(505) 751-4601
(505) 751-9024 fax
www.taospueblo.com

Taos Soil and Water Conservation District
P.O. Box 2787
Rancho de Taos, NM 87557
(505)751-0584
www.nm.nrcs.usda.gov/partnerships/swcd.html#Taos

Taos Valley Acequia Association
5672 NDBC
202 Chamisa Road
Taos, NM 87571
(505)758-9461
(505)758-0317 fax

Town of Taos
400 Camino de la Placita
Taos, N.M. 87571
(505)751-2000
(505)751-2026 fax
www.taosgov.com

X. Information needs and potential sources

A. Information needs:

- Identification of funding needs to implement projects
- Identification of funding sources to implement projects
- Identification of historic land use practices in the stream segment
- Identification of partners that could help implement projects
- Identification of pollution sources in the stream segment
- Identification of potential projects that could be implemented to address problems
- Identification of private land ownership in the watershed
- Identification of problem area(s) that need to be addressed
- Information about 100 year floodplain mapping
- Information about 404 permits in the watershed
- Information about groundwater in the watershed
- Information about historical land uses in the watershed
- Information about new construction in the watershed
- Information about what monitoring and evaluation is occurring
- Information about what monitoring needs to occur
- Information about zoning in the watershed
- Inventory of roads in the watershed and scheduled maintenance

B. Potential sources of information:

- Amigos Bravos
- Army Corps. of Engineers
- BLM
- Library of Congress
- Local knowledge
- NMDG&F / USFWS

- NMDOT, Taos County Transportation Department
- NRCS
- River Network
- River Source
- Taos Pueblo
- Tony Benson, groundwater hydrologist
- Town of Taos & Taos County
- UNM, NMSU, NM Tech, etc.
- USFS

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The author would like to acknowledge the commitment and work put into the creation of this document by the Rio Pueblo de Taos Watershed Group. Without their help, this Watershed Restoration Action Strategy could not have been possible.

Appendix A – NPDES Permit for Wastewater Treatment Facility, DMRs, etc.

See Amigos Bravos Library

Appendix B – Photographs of the watershed

See Amigos Bravos Library

Appendix C – Priority Restoration Projects

Priority Restoration Projects – Rio Pueblo de Taos Watershed:

In October, 2005, the Rio Pueblo de Taos Watershed Group prioritized on-the-ground activities. These included: 1) Salt cedar eradication; 2) trash clean-ups along the Rio Pueblo de Taos; and 3) investigating and passing ordinances and/or other regulations to protect the watershed, including stormwater protection site identification, and a potential demonstration site for best management practices (BMPs).

1. **Salt Cedar Eradication** – Invasive species are having a huge impact on our native riparian ecosystems here in New Mexico and the Rio Pueblo de Taos is no exception. This project would combine outreach and education efforts with on-the-ground removal of invasive salt cedar. This project would be a good opportunity to work with the Bureau of Land Management and add to their on-going efforts to control non-native invasive species at the confluence of the Rio Pueblo de Taos with the Rio Grande.

This would be a long-term project as Salt Cedar needs repeated treatments for full eradication. The Taos County Noxious Weed Committee could be approached to incorporate non-toxic methods of weed control such as goat grazing, smothering and physical removal. Education and collaboration could be achieved by reaching out to land owners, especially those with water rights who clean their ditches every year. These landowners could be approached and educated about the negative biological impacts of salt cedar on the watershed. The ditch associations could be asked to encourage salt cedar removal during their annual ditch cleaning. Large-scale removal projects could be planned with the BLM taking into account willow flycatcher habitat and needs.

Funding for project would include salary expenses for a project coordinator; materials for salt cedar removal/eradication such as black plastic for smothering, tools for hand removal, and funds to rent goats and heavy equipment; funds to create and distribute education materials.

2. Trash Clean-Ups – The watershed is inundated with illegal trash dumping. The problem is two-fold: first new trash dumping needs to be discouraged and stopped and second the old trash piles need to be cleaned up. The project would address these two aspects of the trash problem in the watershed by combining education, incentives, enforcement, and clean-ups.

This project would be a 2-3 year project. The first year would consist of documenting by GPS and mapping trash dumps throughout the watershed; researching the existing solid waste program in the town and the county; creating public information material about these existing programs; researching potential incentive programs and the cost of providing free trash disposal; planning clean-up projects for year two. Years two and three would consist of: 1) Implementing 2-5 clean-up projects that could incorporate working with youth from the high school, working with Taos Search and Rescue to haul up larger items, and Earth Day clean-up opportunities, etc.; 2) Implementing incentive program(s); 3) Working with local officials to better enforce no dumping in the watershed perhaps by using remote sensor cameras, education about fines, patrolling, and investigative actions.

Funding needs for this project would include salaries for a project manager and project administration, funds for supplies for clean-ups, funding to contract heavy equipment operators for heavy trash extraction and removal, funding to create and distribute education materials, funds to implement incentive programs and possibly hire qualified person on a contract basis for freon removal, funds to purchase supplies for enforcement efforts i.e. staff time to investigate illegal dumping activities, remote sensor cameras etc.

3. Watershed Planning - The group identified the need for working with the local government to research and adopt protective watershed ordinances, guidelines and recommendations. We envisioned this project as consisting of a project manager/organizer who would work with local officials to attempt to research, identify, write, pass and begin to implement ordinances and/or other protective regulations or

guidelines that would protect the Rio Pueblo de Taos. Examples of ordinances could include a stream buffer ordinance that would restrict development within a certain distance from the river or an ordinance that requires any new development to contain all stormwater runoff onsite to reduce stormwater runoff and increase aquifer recharge. These are only two examples of many different ordinances or other mechanisms that could be pursued to protect our watershed. This project could also include a demonstration project to show how stormwater can be directed, filtered and/or collected.

This project would most likely be a 2-3 year project. Year one would consist of researching ordinances and potential regulations and practices, developing relationships with local government, planning and implementing a public education campaign, and beginning to construct a demonstration project. Year two would include finishing the demonstration project, developing language for an ordinance or regulation and/or recommendations, focus public outreach campaign to educate the public about the proposed action. Year three would consist of working to pass ordinance/regulation or town or county-wide recommendations for development and watershed planning. Funding would be needed for an Organizer, an outreach campaign, materials and labor to install the demonstration project, consultant (i.e. engineer) for designing the demonstration project and a consultant (i.e. engineer or professional planner) to develop recommendations for practices and potential regulations.

Works Cited

10th Cir. 1996. City of Albuquerque v. Browner, 97 F.3d 415

Amigos Bravos, 1988. Welcome to Amigos Bravos. (<http://www.amigosbravos.org/> 09-15-05)

---. 2002. Clean Water Circuit Rider Program.

(<http://www.amigosbravos.org/projects/cleanwatercircuitrider/cleanwatercircuitrider.html> 09-15-05)

Bauer, Paul W., Johnson, Peggy, S. & Kelson, Keith I. 1999. Geology and Hydrogeology of the Southern Taos Valley, Taos County, New Mexico: Final Technical Report. New Mexico Office of the State Engineer/Interstate Stream Commission. Santa Fe, 1999

Bauer, Paul W. & Kelson, Keith I. 2003. Preliminary Geologic Map of the Los Cordovas 7.5 Minute Quadrangle. New Mexico Bureau of Geology, New Mexico Tech. May, 2003

Cutler, Regina. 1999. To Clear the Muddy Waters: Tribal Regulatory Authority Under Section 518 of the Clean Water Act. *Environmental Law*. Env't 1 721, 1999

D.Mont., 1996. Montana v. U.S. Environmental Protection Agency, 941 F. Supp. 945

Gordan-McCutcham, R.C. *The Taos Indians and the Battle for Blue Lake*. Red Crane Press. Santa Fe, 1990

Hacker, Leroy W., Carleton, Joseph O., Nether, Raymond, E., Maxwell, Harold B., Buchannon, William A., Folks, James J., Neal, Charles R., King, Donald R., Daiymple, Kenneth L., Winkelmars, Paul, Bookieess, Edward, Kingsolver, Elmer. 1976. *Soil Survey of Taos County and Parts of Rio Arriba and Mora Counties, New Mexico*. USDA, SCS, USFS, USDI, BIA, BLM, in cooperation with New Mexico Agricultural Experiment Station. 1976

Kono, Kevin. 2001. *The Clean Water Act: The Environmental Protection Agency's Duty to Enforce Tribal Water Quality Standards Against Upstream Polluters.* *Oregon Law Review*, University of Oregon. 80, Or.L. Rev. 677, 2001

Kuykendall, Charles B. 1995. *Watershed Report 1995 Rio Don Fernando & Rio Pueblo*. Camino Real Ranger District, Carson National Forest, Taos County, New Mexico. September, 1995

Johnson, Peggy S. 2001. *Water in the Desert*. New Mexico Earth Matters. NM Bureau of Mines and Mineral Resources. Vol. 1, No. 1, 2001

NMED, 1999. *Watershed Restoration Action Strategy (WRAS) For Category I Priority Watersheds in New Mexico*. Surface Water Quality Bureau, New Mexico Environment Department. September, 1999.

---. 2004. *2004-2006 State of New Mexico Integrated Clean Water Act 303(d)/305(b) Report*. NMED-SWQ-2004/01, Santa Fe, 2004

Potter, Michele, 2001. *Heart of the Pueblo: The little river with big history*. *High Country*, 2001

Rivera, J. A. 1998. *Acequia Culture: Water, Land and Community in the Southwest*. University of New Mexico. Albuquerque, NM. 1998

Royster, Judith, V. 1999. *Environmental Federalism and the Third Sovereign: Limits on State Authority to Regulate Water Quality in Indian Country*. University of Tulsa, 1999

Skinner, Bill. 2005. *Rio Pueblo de Taos GIS Maps*. New Mexico Environment Department. September, 2005

The Town of Taos, 1999. *Vision 2020 Master Plan*. Resolution No. 99-6

U.S. Department of Agriculture, Natural Resources Conservation Service. 1990. *New Mexico Annual Precipitation Map*. (<http://www.wrcc.dri.edu/pcpn/prism/nm.jpg> 09-15-05)

U.S. EPA. 1994. *Water Quality Standards Handbook*. EPA-823-B-94-005a. Washington, D.C., 1994

Western Regional Climate Center, 2004. *Period of Record Monthly Climate Summary, Taos*,

NM. (<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl/nmtaos> 09-15-05)

Whiteman, David C. Mountain Meteorology: Fundamentals and Applications. Oxford University Press, New York. 2000